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WHAT IS CLAIMED IS:

1. A photo-sensing device package comprising:

(a) an assembly portion including:

- 10 i. a substrate formed of a material substantially transparent to light within a predetermined range of wavelengths;
- ii. at least one metal layer formed on said substrate about a front surface region thereof; and,
- 15 iii. at least one passivation layer formed to extend over said metal layer, said passivation layer being patterned to define a plurality of access openings to respectively describe on said metal layer a plurality of first solder wettable pads and at least one second solder wettable pad;

- 20 (b) a sensing portion including at least one photo-sensing die for photo-electronically transducing light within said predetermined range of wavelengths, said photo-sensing die defining a photo-sensing area opposing said front surface region of said assembly portion substrate, said photo-sensing die having formed thereon a plurality of solder bump pads;

5 (c) a plurality of first solder joints joining said sensing and
assembly portions, each of said first solder joints extending
between one said solder bump pad of said sensing portion and
one said first solder wettable pad of said assembly portion; and,
10 (d) at least one second solder joint coupled to said second solder
wetable pad for joining said assembly portion to external
circuitry.

2. The photo-sensing device package as recited in Claim 1 wherein said
assembly portion further includes at least one third solder wettable pad for
15 interconnection of an auxiliary electronic component thereto.

3. The photo-sensing device package as recited in Claim 1 wherein said
assembly portion includes a polymer structure disposed about at least a portion
of said photo-sensing die for side wall protection and seal thereof.

20 4. The photo-sensing device package as recited in Claim 1 wherein said
external circuitry joined to said assembly portion by said second solder joint
includes a flexible film member.

5 5. The photo-sensing device package as recited in Claim 1 wherein said
substrate is formed of a glass material.

6. The photo-sensing device package as recited in Claim 1 wherein said
substrate is formed with a thickness within the approximate range of 250 to 800
10 micrometers.

7. The photo-sensing device package as recited in Claim 1 wherein said
assembly portion includes a plurality of said metal layers, at least one of said
metal layers being formed at least partially on said passivation layer to extend at
15 least partially over said first and second access openings and form said first and
second solder wettable pads.

8. The photo-sensing device package as recited in Claim 7 wherein said
metal layer forming said solder wettable pads includes an electroless Ni material.

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9. The photo-sensing device package as recited in Claim 1 wherein said
first and second solder wettable pads of said assembly portion are each formed

5 with a multi-layered structure including at least an adhesion layer, a diffusion barrier layer, and a solder wettable layer.

10. The photo-sensing device package as recited in Claim 1 wherein said substrate includes a rear surface on a side thereof opposing said front surface,
10 said substrate having a thin film coating formed on at least one of said front and rear surfaces for altering the transmissivity therethrough of light within said predetermined range of wavelengths.

11. The photo-sensing device package as recited in Claim 4 wherein said
15 second solder wettable pad is interconnected to at least one said first solder wettable pad, at least one said first solder wettable pad being disposed between said second solder wettable pad and said photo-sensing die.

12. A method of packaging a photo-sensing device comprising the steps
20 of:

(a) establishing at least one photo-sensing die defining a photo-sensing area at a forward surface thereof for photo-electronically transducing light within a predetermined range of wavelengths;

- 5 (b) forming on said photo-sensing die a plurality of solder bump pads electrically coupled to said photo-sensing area;
- (c) establishing at least one unit substrate formed of a material substantially transparent to light within said predetermined range of wavelengths;
- 10 (d) forming on said unit substrate at least one metal layer and at least one passivation layer adjacent thereto to define at least first and second interconnected sets of solder wettable pads;
- (e) placing said photo-sensing die in inverted manner over said unit substrate, said solder bump pads substantially aligning respectively
- 15 with said first solder wettable pads; and,
- (f) forming a solder joint between said second solder wettable pad and external circuitry to interconnect said external circuitry to said unit substrate.

- 20 13. The method of packaging a photo-sensing device as recited in Claim 12 wherein said step (f) includes forming said solder joint to join a flexible film member to said second solder wettable pad.

5 14. The method of packaging a photo-sensing device as recited in Claim
12 wherein step (d) includes forming a plurality of said metal layers, an upper one
of said metal layers being extending at least partially on said passivation layer
and forming said first and second solder wettable pads, a lower one of said metal
layers forming an interconnection line between said first and second solder
10 wettable pads.

15 15. The method of packaging a photo-sensing device as recited in Claim
14 wherein said upper metal layer includes an electroless Ni material.

15 16. The method of packaging a photo-sensing device as recited in Claim
12 wherein a plurality of said photo-sensing dice are integrally defined on a
wafer, said wafer being diced before step (d) for separation of said photo-sensing
dice one from the other.

20 17. The method of packaging a photo-sensing device as recited in Claim
12 wherein a plurality of said unit substrates are integrally defined on a substrate,
said substrate being diced after step (d) for separation of said unit substrates one
from the other.

5 18. The method of packaging a photo-sensing device as recited in Claim
17 wherein a pick-and-flip-and-place operation is sequentially executed to place
said photo-sensing dice respectively over corresponding ones of said unit
substrates.

10 19. The method of packaging a photo-sensing device as recited in Claim
13 wherein said second solder wettable pad is positioned adjacent said first solder
wetable pad to be displaced from said photo-sensing die.

 20. The method of packaging a photo-sensing device as recited in Claim
15 12 wherein step (d) includes defining said unit substrate a third set of solder
wetable pads offset from said first solder wettable pads for interconnection of at
least one auxiliary electronic component thereto.

 21. A method of packaging a photo-sensing semiconductor device
20 comprising the steps of:

(a) establishing at least one semiconductor die having at least
integrated one photo-sensing area defined at a forward surface thereof

- 5 for photo-electronically transducing light within a predetermined range
of wavelengths;
- (b) forming on said semiconductor die a plurality of solder bump
pads to be electrically coupled to said photo-sensing area;
- (c) establishing at least one unit substrate formed of a material
10 substantially transparent to light within said predetermined range of
wavelengths;
- (e) applying on said unit substrate at least one metal layer and at least
one passivation layer adjacent thereto to define a plurality of laterally
displaced first and second solder wettable pads, said second solder
15 wettable pad being interconnected to at least one said first solder
wetable pad, said passivation layer forming a plurality of first and
second access openings aligned respectively with said first and second
solder wettable pads;
- (f) forming at least one solder bump at each of said first solder
20 wettable pads;
- (g) placing said semiconductor die in inverted manner over said unit
substrate, said solder bump pads engaging respective ones of said
solder bumps;

- 5 (h) applying a polymer material about at least a portion of said photo-sensing die for side wall protection and seal of said photo-sensing area;
- (i) heating each said solder bump to a characteristic reflow temperature thereof to join said solder bump pads and said first solder wettable pads; and,
- 10 (j) attaching a flexible film member to said unit substrate by a solder joint between said flexible film member and at least one said second solder wettable pad.

22. The method of packaging a photo-sensing semiconductor device as

15 recited in Claim 21 wherein step (f) includes forming a plurality of third solder wettable pads for attaching passive electric components thereto.

23. The method of packaging a photo-sensing semiconductor device as

recited in Claim 21 wherein step (h) includes applying about said portion of said

20 photo-sensing die a no flow underfill material to form a protective seal structure.